SEQUENCE LISTING

<110> KAKIMOTO, TATSUO
        HIGUCHI, MASAYUKI
        INOUE, TSUTOMU

<120> ANALYSIS OF AGONIST-ACTIVITY AND ANTAGONIST-ACTIVITY
      TO CYTOKININ RECEPTOR

<130> Q65478

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<151> 2001-03-15

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<170> PatentIn Ver. 2.1

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aag tcg tcg agc agt gac aag aaa tgg cta aag aag cct ctc ttc ttc   96
Lys Ser Ser Ser Ser Asp Lys Lys Trp Leu Lys Lys Pro Leu Phe Phe
                20   25   30

ctg att ttg tgt ggc tct ttg gta att gtt ttg gtt atg ttc tta cgg   144
Leu Ile Leu Cys Gly Ser Leu Val Ile Val Leu Val Met Phe Leu Arg
            35   40   45

tta ggt aga agt cag aag gag gag aca gat tct tgt aat gga gaa gag   192
Leu Gly Arg Ser Gln Lys Glu Glu Thr Asp Ser Cys Asn Gly Glu Glu
        50   55   60

aaa gtg ttg tat aga cat caa aat gtc aca aga agt gag att cat gat   240
Lys Val Leu Tyr Arg His Gln Asn Val Thr Arg Ser Glu Ile His Asp
 65   70   75   80

ttg gtc tct ttg ttc tct gat tca gat cag gta aca tcc ttt gaa tgt   288
Leu Val Ser Leu Phe Ser Asp Ser Asp Gln Val Thr Ser Phe Glu Cys
                85   90   95

cat aag gaa tca agc cct gga atg tgg aca aac tat ggt att aca tgt   336
His Lys Glu Ser Ser Pro Gly Met Trp Thr Asn Tyr Gly Ile Thr Cys
               100   105   110

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tcc ctg agt gtg cgt tct gat aaa caa gag act aga ggg ctt ccc tgg    384
Ser Leu Ser Val Arg Ser Asp Lys Gln Glu Thr Arg Gly Leu Pro Trp
        115             120                 125

aat ctt ggc tta gga cat tct atc tca tca aca tct tgt atg tgt ggt    432
Asn Leu Gly Leu Gly His Ser Ile Ser Ser Thr Ser Cys Met Cys Gly
        130             135                 140

aat ctt gaa ccg att tta cag caa cct gaa aac ctt gag gaa gaa aac    480
Asn Leu Glu Pro Ile Leu Gln Gln Pro Glu Asn Leu Glu Glu Glu Asn
145             150                 155                 160

cat gaa gaa ggg ctg gag cag ggt ttg tca tcg tat tta aga aat gca    528
His Glu Glu Gly Leu Glu Gln Gly Leu Ser Ser Tyr Leu Arg Asn Ala
            165                 170                 175

tgg tgg tgt cta atc ctt ggt gtg tta gtg tgc cat aag att tat gta    576
Trp Trp Cys Leu Ile Leu Gly Val Leu Val Cys His Lys Ile Tyr Val
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tct cat tct aaa gca cga ggt gag agg aaa gag aaa gta cat ctg caa    624
Ser His Ser Lys Ala Arg Gly Glu Arg Lys Glu Lys Val His Leu Gln
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gag gct tta gct cca aag aag cag caa caa cgt gct cag act tct tct    672
Glu Ala Leu Ala Pro Lys Lys Gln Gln Gln Arg Ala Gln Thr Ser Ser
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aga ggg gct gga aga tgg agg aag aat atc ctt ctc ctt ggt att tta    720
Arg Gly Ala Gly Arg Trp Arg Lys Asn Ile Leu Leu Leu Gly Ile Leu
225                 230                 235                 240

gga gga gtt tcc ttc tct gtt tgg tgg ttt tgg gac act aat gag gag    768
Gly Gly Val Ser Phe Ser Val Trp Trp Phe Trp Asp Thr Asn Glu Glu
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atc ata atg aaa agg agg gag act ttg gca aac atg tgt gac gaa cga    816
Ile Ile Met Lys Arg Arg Glu Thr Leu Ala Asn Met Cys Asp Glu Arg
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gca cgt gtt tta caa gat cag ttc aat gtt agc ttg aac cat gtt cat    864
Ala Arg Val Leu Gln Asp Gln Phe Asn Val Ser Leu Asn His Val His
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gcc ttg tct att ctt gta tct aca ttt cat cat ggt aaa atc cca tct    912
Ala Leu Ser Ile Leu Val Ser Thr Phe His His Gly Lys Ile Pro Ser
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gcc att gat cag aga aca ttt gaa gaa tat act gag aga aca aac ttt    960
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Glu Arg Pro Leu Thr Ser Gly Val Ala Tyr Ala Leu Lys Val Pro His
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tca gaa aga gag aaa ttt gaa aag gag cat gga tgg gca ata aag aaa    1056
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atg gaa act gag gac cag aca gtt gta caa gat tgt gtt cct gaa aac    1104
Met Glu Thr Glu Asp Gln Thr Val Val Gln Asp Cys Val Pro Glu Asn
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ttt gat ccc gca ccg att caa gac gaa tac gcg cca gtt ata ttt gct    1152
Phe Asp Pro Ala Pro Ile Gln Asp Glu Tyr Ala Pro Val Ile Phe Ala
        370             375             380

caa gaa act gtt tcc cat att gta tcg gtc gac atg atg tct gga gaa    1200
Gln Glu Thr Val Ser His Ile Val Ser Val Asp Met Met Ser Gly Glu
385             390             395             400

gaa gac cgt gaa aac atc tta cgg gca agg gca tca gga aaa gga gtg    1248
Glu Asp Arg Glu Asn Ile Leu Arg Ala Arg Ala Ser Gly Lys Gly Val
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tta aca tct cca ttt aag ctt ctt aag tca aat cat ctt ggt gtt gtg    1296
Leu Thr Ser Pro Phe Lys Leu Leu Lys Ser Asn His Leu Gly Val Val
            420             425             430

ttg acc ttt gct gtc tat gac acg agc cta ccg cct gat gct aca gaa    1344
Leu Thr Phe Ala Val Tyr Asp Thr Ser Leu Pro Pro Asp Ala Thr Glu
            435             440             445

gaa cag cgt gtt gaa gca act att ggg tac ctt ggt gca tca tat gat    1392
Glu Gln Arg Val Glu Ala Thr Ile Gly Tyr Leu Gly Ala Ser Tyr Asp
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atg cca tcg ctg gtg gag aaa ctt ctt cac caa ctt gcc agc aaa cag    1440
Met Pro Ser Leu Val Glu Lys Leu Leu His Gln Leu Ala Ser Lys Gln
465             470             475             480

aca att gct gtg gat gtt tac gac aca act aac act tca ggt cta ata    1488
Thr Ile Ala Val Asp Val Tyr Asp Thr Thr Asn Thr Ser Gly Leu Ile
            485             490             495

aaa atg tat ggc tca gaa att ggg gat ata agt gag cag cat ata agt    1536
Lys Met Tyr Gly Ser Glu Ile Gly Asp Ile Ser Glu Gln His Ile Ser
            500             505             510

agc ctt gat ttt ggt gat cca tca agg aac cat gag atg cat tgc agg    1584
Ser Leu Asp Phe Gly Asp Pro Ser Arg Asn His Glu Met His Cys Arg
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ttt aag cat aaa ctt ccc att ccc tgg aca gcg ata aca ccg tcg atc    1632
Phe Lys His Lys Leu Pro Ile Pro Trp Thr Ala Ile Thr Pro Ser Ile
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tta gtt ctg gtt att act ttt ctt gtt ggt tat att tta tat gaa gcc    1680
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ctc aaa gct cgt gct gag gcc gct gac att gca aag tca cag ttc cta    1776
Leu Lys Ala Arg Ala Glu Ala Ala Asp Ile Ala Lys Ser Gln Phe Leu
            580             585             590

gca act gtt tct cat gag ata cgg act ccg atg aat gga gtt tta gga    1824
Ala Thr Val Ser His Glu Ile Arg Thr Pro Met Asn Gly Val Leu Gly
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atg ctg aaa atg ctg atg gac acc gat ctt gat gcg aag cag atg gac    1872
Met Leu Lys Met Leu Met Asp Thr Asp Leu Asp Ala Lys Gln Met Asp
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tat gcg caa act gct cat ggc agt ggg aag gat ctt aca tca cta ata    1920
Tyr Ala Gln Thr Ala His Gly Ser Gly Lys Asp Leu Thr Ser Leu Ile
625             630             635             640

aat gag gtt ctt gat cag gca aag att gaa tcc gga agg ctc gag ctt    1968
Asn Glu Val Leu Asp Gln Ala Lys Ile Glu Ser Gly Arg Leu Glu Leu
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gaa aat gtg cct ttt gat atg cgt ttt att ctt gat aat gtt tca tct    2016
Glu Asn Val Pro Phe Asp Met Arg Phe Ile Leu Asp Asn Val Ser Ser
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ctc ctc tct ggc aag gca aat gaa aaa gga att gag ttg gcc gtt tat    2064
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gtt tct agt caa gtt cct gat gtt gta gtc ggt gat ccg agt cgg ttc    2112
Val Ser Ser Gln Val Pro Asp Val Val Val Gly Asp Pro Ser Arg Phe
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cgg cag atc att aca aac ctg gtt gga aac tca atc aaa ttc aca cag    2160
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705             710             715             720

gaa agg gga cac ata ttt atc tca gtg cac ctt gca gat gag gta aag    2208
Glu Arg Gly His Ile Phe Ile Ser Val His Leu Ala Asp Glu Val Lys
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gga tgc agc gag tcc ggt gag aca gtt agc ggg ttt cct gcg gta aat    2304
Gly Cys Ser Glu Ser Gly Glu Thr Val Ser Gly Phe Pro Ala Val Asn
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gca tgg gga agc tgg aag aat ttc aag aca tgt tac agt act gag agt    2352
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cag aat tct gat caa atc aaa ttg cta gtt aca gtg gag gac act gga    2400
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gtt ggc ata cct gtg gat gca caa ggc cga atc ttc aca cct ttt atg    2448
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caa gcc gac agt tcc aca tcg cgg act tat ggt gga act ggc ata ggt    2496
Gln Ala Asp Ser Ser Thr Ser Arg Thr Tyr Gly Gly Thr Gly Ile Gly
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ttg agt ata agc aaa cgt ttg gtt gaa ctc atg caa gga gag atg ggg    2544
Leu Ser Ile Ser Lys Arg Leu Val Glu Leu Met Gln Gly Glu Met Gly
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ttt gtg agt gag ccc ggg ata ggc agt act ttt tca ttt act gga gtt    2592
Phe Val Ser Glu Pro Gly Ile Gly Ser Thr Phe Ser Phe Thr Gly Val
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ttc ggg aaa gca gaa aca aat acg tcg att act aag ctg gaa cga ttc    2640
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gat cta gct att cag gag ttt aca gga ttg aga gca tta gtt att gat    2688
Asp Leu Ala Ile Gln Glu Phe Thr Gly Leu Arg Ala Leu Val Ile Asp
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aac aga aac att aga gca gag gtc acc agg tac gaa ctt cgg aga ctg    2736
Asn Arg Asn Ile Arg Ala Glu Val Thr Arg Tyr Glu Leu Arg Arg Leu
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gga ata tct gca gac att gtt tca agt ctg aga atg gca tgc act tgt    2784
Gly Ile Ser Ala Asp Ile Val Ser Ser Leu Arg Met Ala Cys Thr Cys
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tgt atc agc aaa tta gaa aat ttg gct atg att cta ata gac aaa gac    2832
Cys Ile Ser Lys Leu Glu Asn Leu Ala Met Ile Leu Ile Asp Lys Asp
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gcc tgg aac aag gaa gaa ttt tca gta ctt gac gag ttg ttt acc cga    2880
Ala Trp Asn Lys Glu Glu Phe Ser Val Leu Asp Glu Leu Phe Thr Arg
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agc aaa gta acc ttt aca aga gtc cca aag att ttt ctt ttg gca act    2928
Ser Lys Val Thr Phe Thr Arg Val Pro Lys Ile Phe Leu Leu Ala Thr
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tct gca act ctt act gag cgc agt gag atg aag tct act ggt ctc atc    2976
Ser Ala Thr Leu Thr Glu Arg Ser Glu Met Lys Ser Thr Gly Leu Ile
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gat gag gtg gtg ata aag cct ctt cgg atg agt gtc tta ata tgt tgc    3024
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ttg caa gaa acc ctt gtc aat ggc aag aag agg caa ccg aac aga cag    3072
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cga aga aat ctt gga cac ttg cta aga gaa aaa cag att ctg gtt gtg    3120
Arg Arg Asn Leu Gly His Leu Leu Arg Glu Lys Gln Ile Leu Val Val
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gat gat aat ctt gtg aac aga cga gtt gca gaa ggt gca ctt aag aaa    3168
Asp Asp Asn Leu Val Asn Arg Arg Val Ala Glu Gly Ala Leu Lys Lys
                1045                1050                1055

tat gga gct att gtt aca tgc gtt gag agt ggc aaa gct gca ttg gca    3216
Tyr Gly Ala Ile Val Thr Cys Val Glu Ser Gly Lys Ala Ala Leu Ala
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atg ctt aag ccg cct cat aac ttc gat gct tgc ttc atg gat ctc cag    3264
Met Leu Lys Pro Pro His Asn Phe Asp Ala Cys Phe Met Asp Leu Gln
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atg cct gaa atg gat gga ttt gaa gcg aca agg aga gtc cgt gag ctg    3312
Met Pro Glu Met Asp Gly Phe Glu Ala Thr Arg Arg Val Arg Glu Leu
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gag agg gaa atc aat aag aaa ata gct tct gga gaa gtt tca gct gaa    3360
Glu Arg Glu Ile Asn Lys Lys Ile Ala Ser Gly Glu Val Ser Ala Glu
1105                1110                1115                1120

atg ttc tgt aaa ttt agt agt tgg cac gtc ccg ata tta gca atg aca    3408
Met Phe Cys Lys Phe Ser Ser Trp His Val Pro Ile Leu Ala Met Thr
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gca gat gtt att cag gct act cat gaa gaa tgc atg aaa tgt gga atg    3456
Ala Asp Val Ile Gln Ala Thr His Glu Glu Cys Met Lys Cys Gly Met
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gat ggt tat gta tca aaa ccg ttt gaa gag gaa gtg ctc tac aca gcg    3504
Asp Gly Tyr Val Ser Lys Pro Phe Glu Glu Glu Val Leu Tyr Thr Ala
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Lys Val Leu Tyr Arg His Gln Asn Val Thr Arg Ser Glu Ile His Asp
65              70              75              80

Leu Val Ser Leu Phe Ser Asp Ser Asp Gln Val Thr Ser Phe Glu Cys
                85              90              95

His Lys Glu Ser Ser Pro Gly Met Trp Thr Asn Tyr Gly Ile Thr Cys
            100             105             110

Ser Leu Ser Val Arg Ser Asp Lys Gln Glu Thr Arg Gly Leu Pro Trp
        115             120             125

Asn Leu Gly Leu Gly His Ser Ile Ser Ser Thr Ser Cys Met Cys Gly
    130             135             140

Asn Leu Glu Pro Ile Leu Gln Gln Pro Glu Asn Leu Glu Glu Glu Asn
145             150             155             160

His Glu Glu Gly Leu Glu Gln Gly Leu Ser Ser Tyr Leu Arg Asn Ala
            165             170             175

Trp Trp Cys Leu Ile Leu Gly Val Leu Val Cys His Lys Ile Tyr Val
        180             185             190

Ser His Ser Lys Ala Arg Gly Glu Arg Lys Glu Lys Val His Leu Gln
        195             200             205

Glu Ala Leu Ala Pro Lys Lys Gln Gln Gln Arg Ala Gln Thr Ser Ser
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Arg Gly Ala Gly Arg Trp Arg Lys Asn Ile Leu Leu Leu Gly Ile Leu
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Gly Gly Val Ser Phe Ser Val Trp Trp Phe Trp Asp Thr Asn Glu Glu
            245             250             255

Ile Ile Met Lys Arg Arg Glu Thr Leu Ala Asn Met Cys Asp Glu Arg
            260             265             270

Ala Arg Val Leu Gln Asp Gln Phe Asn Val Ser Leu Asn His Val His
        275             280             285

Ala Leu Ser Ile Leu Val Ser Thr Phe His His Gly Lys Ile Pro Ser
    290             295             300

Ala Ile Asp Gln Arg Thr Phe Glu Glu Tyr Thr Glu Arg Thr Asn Phe
305             310             315             320

Glu Arg Pro Leu Thr Ser Gly Val Ala Tyr Ala Leu Lys Val Pro His
            325             330             335
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Ser Glu Arg Glu Lys Phe Glu Lys Glu His Gly Trp Ala Ile Lys Lys
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Met Glu Thr Glu Asp Gln Thr Val Val Gln Asp Cys Val Pro Glu Asn
        355             360                 365

Phe Asp Pro Ala Pro Ile Gln Asp Glu Tyr Ala Pro Val Ile Phe Ala
    370             375                 380

Gln Glu Thr Val Ser His Ile Val Ser Val Asp Met Met Ser Gly Glu
385             390                 395                 400

Glu Asp Arg Glu Asn Ile Leu Arg Ala Arg Ala Ser Gly Lys Gly Val
            405             410                 415

Leu Thr Ser Pro Phe Lys Leu Leu Lys Ser Asn His Leu Gly Val Val
        420             425                 430

Leu Thr Phe Ala Val Tyr Asp Thr Ser Leu Pro Pro Asp Ala Thr Glu
        435             440                 445

Glu Gln Arg Val Glu Ala Thr Ile Gly Tyr Leu Gly Ala Ser Tyr Asp
    450             455                 460

Met Pro Ser Leu Val Glu Lys Leu Leu His Gln Leu Ala Ser Lys Gln
465             470                 475                 480

Thr Ile Ala Val Asp Val Tyr Asp Thr Thr Asn Thr Ser Gly Leu Ile
            485             490                 495

Lys Met Tyr Gly Ser Glu Ile Gly Asp Ile Ser Glu Gln His Ile Ser
            500             505                 510

Ser Leu Asp Phe Gly Asp Pro Ser Arg Asn His Glu Met His Cys Arg
        515             520                 525

Phe Lys His Lys Leu Pro Ile Pro Trp Thr Ala Ile Thr Pro Ser Ile
    530             535                 540

Leu Val Leu Val Ile Thr Phe Leu Val Gly Tyr Ile Leu Tyr Glu Ala
545             550                 555                 560

Ile Asn Arg Ile Ala Thr Val Glu Glu Asp Cys Gln Lys Met Arg Glu
            565             570                 575

Leu Lys Ala Arg Ala Glu Ala Ala Asp Ile Ala Lys Ser Gln Phe Leu
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Ala Thr Val Ser His Glu Ile Arg Thr Pro Met Asn Gly Val Leu Gly
        595             600                 605

Met Leu Lys Met Leu Met Asp Thr Asp Leu Asp Ala Lys Gln Met Asp
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Tyr Ala Gln Thr Ala His Gly Ser Gly Lys Asp Leu Thr Ser Leu Ile
625             630                 635                 640
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Leu Leu Ser Gly Lys Ala Asn Glu Lys Gly Ile Glu Leu Ala Val Tyr
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Val Ser Ser Gln Val Pro Asp Val Val Val Gly Asp Pro Ser Arg Phe
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Arg Gln Ile Ile Thr Asn Leu Val Gly Asn Ser Ile Lys Phe Thr Gln
705             710             715             720

Glu Arg Gly His Ile Phe Ile Ser Val His Leu Ala Asp Glu Val Lys
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Glu Pro Leu Thr Ile Glu Asp Ala Val Leu Lys Gln Arg Leu Ala Leu
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Gly Cys Ser Glu Ser Gly Glu Thr Val Ser Gly Phe Pro Ala Val Asn
             755             760             765

Ala Trp Gly Ser Trp Lys Asn Phe Lys Thr Cys Tyr Ser Thr Glu Ser
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Gln Asn Ser Asp Gln Ile Lys Leu Leu Val Thr Val Glu Asp Thr Gly
785             790             795             800

Val Gly Ile Pro Val Asp Ala Gln Gly Arg Ile Phe Thr Pro Phe Met
             805             810             815

Gln Ala Asp Ser Ser Thr Ser Arg Thr Tyr Gly Gly Thr Gly Ile Gly
             820             825             830

Leu Ser Ile Ser Lys Arg Leu Val Glu Leu Met Gln Gly Glu Met Gly
             835             840             845

Phe Val Ser Glu Pro Gly Ile Gly Ser Thr Phe Ser Phe Thr Gly Val
    850             855             860

Phe Gly Lys Ala Glu Thr Asn Thr Ser Ile Thr Lys Leu Glu Arg Phe
865             870             875             880

Asp Leu Ala Ile Gln Glu Phe Thr Gly Leu Arg Ala Leu Val Ile Asp
             885             890             895

Asn Arg Asn Ile Arg Ala Glu Val Thr Arg Tyr Glu Leu Arg Arg Leu
             900             905             910

Gly Ile Ser Ala Asp Ile Val Ser Ser Leu Arg Met Ala Cys Thr Cys
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Cys Ile Ser Lys Leu Glu Asn Leu Ala Met Ile Leu Ile Asp Lys Asp
    930             935             940
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Ala Trp Asn Lys Glu Glu Phe Ser Val Leu Asp Glu Leu Phe Thr Arg
945   950   955   960

Ser Lys Val Thr Phe Thr Arg Val Pro Lys Ile Phe Leu Leu Ala Thr
                965   970   975

Ser Ala Thr Leu Thr Glu Arg Ser Glu Met Lys Ser Thr Gly Leu Ile
            980   985   990

Asp Glu Val Val Ile Lys Pro Leu Arg Met Ser Val Leu Ile Cys Cys
        995   1000   1005

Leu Gln Glu Thr Leu Val Asn Gly Lys Lys Arg Gln Pro Asn Arg Gln
    1010   1015   1020

Arg Arg Asn Leu Gly His Leu Leu Arg Glu Lys Gln Ile Leu Val Val
1025   1030   1035   1040

Asp Asp Asn Leu Val Asn Arg Arg Val Ala Glu Gly Ala Leu Lys Lys
            1045   1050   1055

Tyr Gly Ala Ile Val Thr Cys Val Glu Ser Gly Lys Ala Ala Leu Ala
            1060   1065   1070

Met Leu Lys Pro Pro His Asn Phe Asp Ala Cys Phe Met Asp Leu Gln
    1075   1080   1085

Met Pro Glu Met Asp Gly Phe Glu Ala Thr Arg Arg Val Arg Glu Leu
    1090   1095   1100

Glu Arg Glu Ile Asn Lys Lys Ile Ala Ser Gly Glu Val Ser Ala Glu
1105   1110   1115   1120

Met Phe Cys Lys Phe Ser Ser Trp His Val Pro Ile Leu Ala Met Thr
            1125   1130   1135

Ala Asp Val Ile Gln Ala Thr His Glu Glu Cys Met Lys Cys Gly Met
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1               5                   10                  15

ttc tgg atg cta tgc tgc tgg ttt gtt tct tgg ttc gtt gat aat ggg    96
Phe Trp Met Leu Cys Cys Trp Phe Val Ser Trp Phe Val Asp Asn Gly
            20                  25                  30

atc gag gac aag tct ggt ctt tta gtt ggc tct gtc ggt gat ctt gag   144
Ile Glu Asp Lys Ser Gly Leu Leu Val Gly Ser Val Gly Asp Leu Glu
            35                  40                  45

aag act aag atg act acg ttg aag aag aag aac aag atg tgg ttc tgg   192
Lys Thr Lys Met Thr Thr Leu Lys Lys Lys Asn Lys Met Trp Phe Trp
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65                  70                  75                  80

ttt ctt ggc tct gtt aaa ttc aac aag gcg tgg tgg agg aag ctt gtg   288
Phe Leu Gly Ser Val Lys Phe Asn Lys Ala Trp Trp Arg Lys Leu Val
                85                  90                  95

gtg gtt tgg gtt gtc ttc tgg gtc ttg gtc tct att tgg acg ttt tgg   336
Val Val Trp Val Val Phe Trp Val Leu Val Ser Ile Trp Thr Phe Trp
            100                 105                 110

tac ttt agc tcg caa gct atg gag aag agg aaa gag acg cta gct agt   384
Tyr Phe Ser Ser Gln Ala Met Glu Lys Arg Lys Glu Thr Leu Ala Ser
        115                 120                 125

atg tgt gat gag aga gct cgt atg ctg cag gat cag ttc aac gtt agc   432
Met Cys Asp Glu Arg Ala Arg Met Leu Gln Asp Gln Phe Asn Val Ser
        130                 135                 140

atg aat cat gtt caa gcc atg tct atc ttg atc tca acc ttc cac cat   480
Met Asn His Val Gln Ala Met Ser Ile Leu Ile Ser Thr Phe His His
145                 150                 155                 160

ggc aag att cct tct gct atc gat cag aga aca ttc tca gag tac act   528
Gly Lys Ile Pro Ser Ala Ile Asp Gln Arg Thr Phe Ser Glu Tyr Thr
                165                 170                 175

gat aga act tcc ttt gag agg cct ctt act agc ggg gta gct tat gct   576
Asp Arg Thr Ser Phe Glu Arg Pro Leu Thr Ser Gly Val Ala Tyr Ala
            180                 185                 190

atg agg gtg ctc cat tca gag agg gaa gag ttc gag agg caa caa ggt   624
Met Arg Val Leu His Ser Glu Arg Glu Glu Phe Glu Arg Gln Gln Gly
        195                 200                 205

tgg act att agg aag atg tat tct ctt gaa caa aac cca gtt cac aag   672
Trp Thr Ile Arg Lys Met Tyr Ser Leu Glu Gln Asn Pro Val His Lys
        210                 215                 220
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gat gac tat gac ctg gaa gct ttg gaa cca tcc cct gtc caa gaa gag    720
Asp Asp Tyr Asp Leu Glu Ala Leu Glu Pro Ser Pro Val Gln Glu Glu
225                 230             235                 240

tac gct cca gtc atc ttt gct cag gac act gtt tct cac gtt gtt tct    768
Tyr Ala Pro Val Ile Phe Ala Gln Asp Thr Val Ser His Val Val Ser
                245             250                 255

ctc gat atg ctg tct ggg aaa gaa gat cgt gaa aac gtt ttg cgg gcc    816
Leu Asp Met Leu Ser Gly Lys Glu Asp Arg Glu Asn Val Leu Arg Ala
                260             265                 270

agg agt tca ggt aaa ggg gtt ttg aca gct cct ttc cca ttg ata aag    864
Arg Ser Ser Gly Lys Gly Val Leu Thr Ala Pro Phe Pro Leu Ile Lys
            275             280             285

aca aat aga ctt ggg gtg atc ctg aca ttt gca gtg tac aag aga gat    912
Thr Asn Arg Leu Gly Val Ile Leu Thr Phe Ala Val Tyr Lys Arg Asp
        290             295             300

ctc ccc tcc aat gca acg cca aaa gag aga att gag gct act aac ggg    960
Leu Pro Ser Asn Ala Thr Pro Lys Glu Arg Ile Glu Ala Thr Asn Gly
305             310             315             320

tat ctc ggg gga gtg ttt gac att gag tcc ctg gta gaa aac ttg ctt    1008
Tyr Leu Gly Gly Val Phe Asp Ile Glu Ser Leu Val Glu Asn Leu Leu
            325             330             335

caa cag ctg gct agc aag caa acg att ctt gtc aat gtg tac gat atc    1056
Gln Gln Leu Ala Ser Lys Gln Thr Ile Leu Val Asn Val Tyr Asp Ile
            340             345             350

acc aat cac tct caa ccg att agc atg tat ggt aca aat gtg tcg gct    1104
Thr Asn His Ser Gln Pro Ile Ser Met Tyr Gly Thr Asn Val Ser Ala
        355             360             365

gat ggg ttg gaa cgt gtt agt cca cta atc ttt ggc gat cca ttg aga    1152
Asp Gly Leu Glu Arg Val Ser Pro Leu Ile Phe Gly Asp Pro Leu Arg
        370             375             380

aag cat gag atg cgt tgc aga ttt aag cag aaa cca cca tgg cca gtg    1200
Lys His Glu Met Arg Cys Arg Phe Lys Gln Lys Pro Pro Trp Pro Val
385             390             395             400

cta tca atg gtg aca tca ttc ggt atc ctt gtg att gcg tta ctt gtt    1248
Leu Ser Met Val Thr Ser Phe Gly Ile Leu Val Ile Ala Leu Leu Val
            405             410             415

gca cat ata atc cac gca acc gtt agt cga ata cac aaa gtt gaa gaa    1296
Ala His Ile Ile His Ala Thr Val Ser Arg Ile His Lys Val Glu Glu
        420             425             430

gat tgt gat aaa atg aag cag ctc aag aaa aag gct gaa gca gca gat    1344
Asp Cys Asp Lys Met Lys Gln Leu Lys Lys Lys Ala Glu Ala Ala Asp
        435             440             445
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gtt gca aag tca cag ttc ctt gcc act gtt tca cat gaa atc aga act    1392
Val Ala Lys Ser Gln Phe Leu Ala Thr Val Ser His Glu Ile Arg Thr
    450             455             460

cca atg aat ggt gtt cta gga atg ttg cat atg ctt atg gac aca gag    1440
Pro Met Asn Gly Val Leu Gly Met Leu His Met Leu Met Asp Thr Glu
465             470             475             480

tta gat gtt acg caa cag gat tat gtt agg acc gca cag gca agt gga    1488
Leu Asp Val Thr Gln Gln Asp Tyr Val Arg Thr Ala Gln Ala Ser Gly
            485             490             495

aaa gct tta gtc tcg cta ata aat gag gtt ttg gac caa gca aag att    1536
Lys Ala Leu Val Ser Leu Ile Asn Glu Val Leu Asp Gln Ala Lys Ile
            500             505             510

gaa tct gga aag ctt gaa ctt gag gag gtg cgg ttt gat ttg aga gga    1584
Glu Ser Gly Lys Leu Glu Leu Glu Glu Val Arg Phe Asp Leu Arg Gly
        515             520             525

ata tta gat gat gtc ctg tca ctc ttc tct agc aag tcc caa caa aag    1632
Ile Leu Asp Asp Val Leu Ser Leu Phe Ser Ser Lys Ser Gln Gln Lys
    530             535             540

ggg gtg gag ttg gca gta tac ata tct gat cgt gtt cca gat atg tta    1680
Gly Val Glu Leu Ala Val Tyr Ile Ser Asp Arg Val Pro Asp Met Leu
545             550             555             560

att ggt gat cct ggg agg ttt cga caa ata ctc aca aat ctt atg ggt    1728
Ile Gly Asp Pro Gly Arg Phe Arg Gln Ile Leu Thr Asn Leu Met Gly
            565             570             575

aat tcc att aag ttc act gag aaa gga cac atc ttt gta act gtt cat    1776
Asn Ser Ile Lys Phe Thr Glu Lys Gly His Ile Phe Val Thr Val His
            580             585             590

ttg gtg gat gag cta ttt gaa tct atc gat gga gag aca gca tca tct    1824
Leu Val Asp Glu Leu Phe Glu Ser Ile Asp Gly Glu Thr Ala Ser Ser
        595             600             605

ccg gaa agt aca ctg agt ggg ctt cca gtt gca gac cgg cag agg agc    1872
Pro Glu Ser Thr Leu Ser Gly Leu Pro Val Ala Asp Arg Gln Arg Ser
    610             615             620

tgg gaa aac ttt aaa gct ttc agc tcc aac ggg cat cgg agc ttt gaa    1920
Trp Glu Asn Phe Lys Ala Phe Ser Ser Asn Gly His Arg Ser Phe Glu
625             630             635             640

cca tct ccc cct gat ata aac cta atc gtc tca gtt gag gat act ggc    1968
Pro Ser Pro Pro Asp Ile Asn Leu Ile Val Ser Val Glu Asp Thr Gly
            645             650             655

gta ggg atc cct gta gaa gcg cag tcc cgt att ttt acg cct ttc atg    2016
Val Gly Ile Pro Val Glu Ala Gln Ser Arg Ile Phe Thr Pro Phe Met
            660             665             670
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caa gtc gga cca tcc ata tcc agg acg cat gga ggc aca gga att gga    2064
Gln Val Gly Pro Ser Ile Ser Arg Thr His Gly Gly Thr Gly Ile Gly
        675             680             685

ctt agc ata agc aaa tgt cta gtt gga ctg atg aag gga gaa att gga    2112
Leu Ser Ile Ser Lys Cys Leu Val Gly Leu Met Lys Gly Glu Ile Gly
        690             695             700

ttc tcg agt act ccc aag gtt ggg tcc aca ttc aca ttt act gct gta    2160
Phe Ser Ser Thr Pro Lys Val Gly Ser Thr Phe Thr Phe Thr Ala Val
705             710             715             720

ttt tcc aat ggg atg caa cca gct gaa aga aag aat gac aac aac cag    2208
Phe Ser Asn Gly Met Gln Pro Ala Glu Arg Lys Asn Asp Asn Asn Gln
            725             730             735

ccc ata ttc tcg gaa ttc cgg ggc atg aaa gct gtg gtt gtg gac cat    2256
Pro Ile Phe Ser Glu Phe Arg Gly Met Lys Ala Val Val Val Asp His
            740             745             750

agg cct gca agg gca aaa gtc tcg tgg tac cat ttt cag cgt ctt gga    2304
Arg Pro Ala Arg Ala Lys Val Ser Trp Tyr His Phe Gln Arg Leu Gly
        755             760             765

att cga gtc gaa gta gtt cca cgt gtt gaa cag gct cta cat tat ctg    2352
Ile Arg Val Glu Val Val Pro Arg Val Glu Gln Ala Leu His Tyr Leu
        770             775             780

aag att ggt act acc act gtg aat atg ata ctc ata gag caa gaa ata    2400
Lys Ile Gly Thr Thr Thr Val Asn Met Ile Leu Ile Glu Gln Glu Ile
785             790             795             800

tgg aat agg gaa gca gat gat ttc att aaa aag cta cag aaa gac cct    2448
Trp Asn Arg Glu Ala Asp Asp Phe Ile Lys Lys Leu Gln Lys Asp Pro
            805             810             815

ctt ttc ctt tct cct aag ttg att ttg tta gca aac tca gta gaa tcg    2496
Leu Phe Leu Ser Pro Lys Leu Ile Leu Leu Ala Asn Ser Val Glu Ser
        820             825             830

tca ata tca gag gct tta tgc acc ggt ata gat cct cca ata gtg ata    2544
Ser Ile Ser Glu Ala Leu Cys Thr Gly Ile Asp Pro Pro Ile Val Ile
        835             840             845

gtg aaa cca ttg agg gcg agt atg cta gca gca act ttg cag agg gga    2592
Val Lys Pro Leu Arg Ala Ser Met Leu Ala Ala Thr Leu Gln Arg Gly
        850             855             860

ttg ggt att gga atc aga gaa cca cct caa cac aag gga cct cct gct    2640
Leu Gly Ile Gly Ile Arg Glu Pro Pro Gln His Lys Gly Pro Pro Ala
865             870             875             880

ttg att ctc agg aat ctt ctc ctt ggt aga aaa att tta atc gtg gat    2688
Leu Ile Leu Arg Asn Leu Leu Leu Gly Arg Lys Ile Leu Ile Val Asp
            885             890             895
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gat aac aac gta aac ctc aga gtg gca gcg gga gct ctg aaa aag tac    2736
Asp Asn Asn Val Asn Leu Arg Val Ala Ala Gly Ala Leu Lys Lys Tyr
        900             905             910

gga gct gat gtg gtc tgc gct gag agt ggg ata aag gca atc tca ttg    2784
Gly Ala Asp Val Val Cys Ala Glu Ser Gly Ile Lys Ala Ile Ser Leu
        915             920             925

ctt aag cca cct cac gag ttt gat gct tgc ttc atg gac att cag atg    2832
Leu Lys Pro Pro His Glu Phe Asp Ala Cys Phe Met Asp Ile Gln Met
        930             935             940

cca gaa atg gat gga ttt gaa gct aca agg aga ata cga gat atg gaa    2880
Pro Glu Met Asp Gly Phe Glu Ala Thr Arg Arg Ile Arg Asp Met Glu
945             950             955             960

gag gag atg aac aag aga ata aag aat ggg gag gct ttg ata gta gag    2928
Glu Glu Met Asn Lys Arg Ile Lys Asn Gly Glu Ala Leu Ile Val Glu
            965             970             975

aac ggt aac aaa aca agc tgg cat ctt ccg gta tta gca atg acg gca    2976
Asn Gly Asn Lys Thr Ser Trp His Leu Pro Val Leu Ala Met Thr Ala
            980             985             990

gat gtg atc caa gca acg cat gag gaa tgt ctg aag tgt gga atg gat    3024
Asp Val Ile Gln Ala Thr His Glu Glu Cys Leu Lys Cys Gly Met Asp
            995             1000            1005

ggg tat gta tca aaa cca ttt gaa gca gag cag ctg tac agg gaa gtt    3072
Gly Tyr Val Ser Lys Pro Phe Glu Ala Glu Gln Leu Tyr Arg Glu Val
    1010            1015            1020

tct cgc ttt ttc aat tcg cct tca gat aca gaa tca taa                3111
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1025            1030            1035
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Phe Trp Met Leu Cys Cys Trp Phe Val Ser Trp Phe Val Asp Asn Gly
            20              25              30

Ile Glu Asp Lys Ser Gly Leu Leu Val Gly Ser Val Gly Asp Leu Glu
        35              40              45

Lys Thr Lys Met Thr Thr Leu Lys Lys Lys Asn Lys Met Trp Phe Trp
    50              55              60

Asn Lys Ile Ser Ser Ser Gly Leu Lys Ile Pro Ser Phe Ser Tyr Gln
65              70              75              80
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Phe Leu Gly Ser Val Lys Phe Asn Lys Ala Trp Trp Arg Lys Leu Val
                85              90                  95

Val Val Trp Val Val Phe Trp Val Leu Val Ser Ile Trp Thr Phe Trp
            100             105                 110

Tyr Phe Ser Ser Gln Ala Met Glu Lys Arg Lys Glu Thr Leu Ala Ser
        115             120                 125

Met Cys Asp Glu Arg Ala Arg Met Leu Gln Asp Gln Phe Asn Val Ser
    130             135             140

Met Asn His Val Gln Ala Met Ser Ile Leu Ile Ser Thr Phe His His
145             150             155             160

Gly Lys Ile Pro Ser Ala Ile Asp Gln Arg Thr Phe Ser Glu Tyr Thr
            165             170             175

Asp Arg Thr Ser Phe Glu Arg Pro Leu Thr Ser Gly Val Ala Tyr Ala
        180             185             190

Met Arg Val Leu His Ser Glu Arg Glu Glu Phe Glu Arg Gln Gln Gly
    195             200             205

Trp Thr Ile Arg Lys Met Tyr Ser Leu Glu Gln Asn Pro Val His Lys
    210             215             220

Asp Asp Tyr Asp Leu Glu Ala Leu Glu Pro Ser Pro Val Gln Glu Glu
225             230             235             240

Tyr Ala Pro Val Ile Phe Ala Gln Asp Thr Val Ser His Val Val Ser
            245             250             255

Leu Asp Met Leu Ser Gly Lys Glu Asp Arg Glu Asn Val Leu Arg Ala
            260             265             270

Arg Ser Ser Gly Lys Gly Val Leu Thr Ala Pro Phe Pro Leu Ile Lys
        275             280             285

Thr Asn Arg Leu Gly Val Ile Leu Thr Phe Ala Val Tyr Lys Arg Asp
    290             295             300

Leu Pro Ser Asn Ala Thr Pro Lys Glu Arg Ile Glu Ala Thr Asn Gly
305             310             315             320

Tyr Leu Gly Gly Val Phe Asp Ile Glu Ser Leu Val Glu Asn Leu Leu
            325             330             335

Gln Gln Leu Ala Ser Lys Gln Thr Ile Leu Val Asn Val Tyr Asp Ile
        340             345             350

Thr Asn His Ser Gln Pro Ile Ser Met Tyr Gly Thr Asn Val Ser Ala
        355             360             365

Asp Gly Leu Glu Arg Val Ser Pro Leu Ile Phe Gly Asp Pro Leu Arg
370             375             380
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Lys His Glu Met Arg Cys Arg Phe Lys Gln Lys Pro Pro Trp Pro Val
385   390   395   400

Leu Ser Met Val Thr Ser Phe Gly Ile Leu Val Ile Ala Leu Leu Val
            405   410   415

Ala His Ile Ile His Ala Thr Val Ser Arg Ile His Lys Val Glu Glu
            420   425   430

Asp Cys Asp Lys Met Lys Gln Leu Lys Lys Lys Ala Glu Ala Ala Asp
        435   440   445

Val Ala Lys Ser Gln Phe Leu Ala Thr Val Ser His Glu Ile Arg Thr
    450   455   460

Pro Met Asn Gly Val Leu Gly Met Leu His Met Leu Met Asp Thr Glu
465   470   475   480

Leu Asp Val Thr Gln Gln Asp Tyr Val Arg Thr Ala Gln Ala Ser Gly
            485   490   495

Lys Ala Leu Val Ser Leu Ile Asn Glu Val Leu Asp Gln Ala Lys Ile
            500   505   510

Glu Ser Gly Lys Leu Glu Leu Glu Glu Val Arg Phe Asp Leu Arg Gly
        515   520   525

Ile Leu Asp Asp Val Leu Ser Leu Phe Ser Ser Lys Ser Gln Gln Lys
    530   535   540

Gly Val Glu Leu Ala Val Tyr Ile Ser Asp Arg Val Pro Asp Met Leu
545   550   555   560

Ile Gly Asp Pro Gly Arg Phe Arg Gln Ile Leu Thr Asn Leu Met Gly
            565   570   575

Asn Ser Ile Lys Phe Thr Glu Lys Gly His Ile Phe Val Thr Val His
            580   585   590

Leu Val Asp Glu Leu Phe Glu Ser Ile Asp Gly Glu Thr Ala Ser Ser
        595   600   605

Pro Glu Ser Thr Leu Ser Gly Leu Pro Val Ala Asp Arg Gln Arg Ser
    610   615   620

Trp Glu Asn Phe Lys Ala Phe Ser Ser Asn Gly His Arg Ser Phe Glu
625   630   635   640

Pro Ser Pro Pro Asp Ile Asn Leu Ile Val Ser Val Glu Asp Thr Gly
            645   650   655

Val Gly Ile Pro Val Glu Ala Gln Ser Arg Ile Phe Thr Pro Phe Met
            660   665   670

Gln Val Gly Pro Ser Ile Ser Arg Thr His Gly Gly Thr Gly Ile Gly
        675   680   685

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Leu Ser Ile Ser Lys Cys Leu Val Gly Leu Met Lys Gly Glu Ile Gly
    690             695             700

Phe Ser Ser Thr Pro Lys Val Gly Ser Thr Phe Thr Phe Thr Ala Val
705             710             715             720

Phe Ser Asn Gly Met Gln Pro Ala Glu Arg Lys Asn Asp Asn Asn Gln
            725             730             735

Pro Ile Phe Ser Glu Phe Arg Gly Met Lys Ala Val Val Val Asp His
            740             745             750

Arg Pro Ala Arg Ala Lys Val Ser Trp Tyr His Phe Gln Arg Leu Gly
        755             760             765

Ile Arg Val Glu Val Val Pro Arg Val Glu Gln Ala Leu His Tyr Leu
    770             775             780

Lys Ile Gly Thr Thr Thr Val Asn Met Ile Leu Ile Glu Gln Glu Ile
785             790             795             800

Trp Asn Arg Glu Ala Asp Asp Phe Ile Lys Lys Leu Gln Lys Asp Pro
            805             810             815

Leu Phe Leu Ser Pro Lys Leu Ile Leu Leu Ala Asn Ser Val Glu Ser
        820             825             830

Ser Ile Ser Glu Ala Leu Cys Thr Gly Ile Asp Pro Pro Ile Val Ile
        835             840             845

Val Lys Pro Leu Arg Ala Ser Met Leu Ala Ala Thr Leu Gln Arg Gly
    850             855             860

Leu Gly Ile Gly Ile Arg Glu Pro Pro Gln His Lys Gly Pro Pro Ala
865             870             875             880

Leu Ile Leu Arg Asn Leu Leu Leu Gly Arg Lys Ile Leu Ile Val Asp
            885             890             895

Asp Asn Asn Val Asn Leu Arg Val Ala Ala Gly Ala Leu Lys Lys Tyr
            900             905             910

Gly Ala Asp Val Val Cys Ala Glu Ser Gly Ile Lys Ala Ile Ser Leu
        915             920             925

Leu Lys Pro Pro His Glu Phe Asp Ala Cys Phe Met Asp Ile Gln Met
    930             935             940

Pro Glu Met Asp Gly Phe Glu Ala Thr Arg Arg Ile Arg Asp Met Glu
945             950             955             960

Glu Glu Met Asn Lys Arg Ile Lys Asn Gly Glu Ala Leu Ile Val Glu
            965             970             975

Asn Gly Asn Lys Thr Ser Trp His Leu Pro Val Leu Ala Met Thr Ala
            980             985             990
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Asp Val Ile Gln Ala Thr His Glu Glu Cys Leu Lys Cys Gly Met Asp
        995                1000                1005

Gly Tyr Val Ser Lys Pro Phe Glu Ala Glu Gln Leu Tyr Arg Glu Val
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Ser Arg Phe Phe Asn Ser Pro Ser Asp Thr Glu Ser
1025                1030                1035
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Met Asn Trp Ala Leu Asn Asn His Gln Glu Glu Glu Glu Glu Pro Arg
 1               5               10              15

aga att gaa att tct gat tcc gag tca cta gaa aac ttg aaa agc agc    96
Arg Ile Glu Ile Ser Asp Ser Glu Ser Leu Glu Asn Leu Lys Ser Ser
            20              25              30

gat ttt tat caa ctg ggt ggt ggt ggt gct ctg aat tcg tca gaa aag   144
Asp Phe Tyr Gln Leu Gly Gly Gly Gly Ala Leu Asn Ser Ser Glu Lys
        35              40              45

ccg aga aag atc gat ttt tgg cgt tcg ggg ttg atg ggt ttt gcg aag   192
Pro Arg Lys Ile Asp Phe Trp Arg Ser Gly Leu Met Gly Phe Ala Lys
    50              55              60

atg cag cag cag caa cag ctt cag cat tca gtg gcg gtg aag atg aac   240
Met Gln Gln Gln Gln Gln Leu Gln His Ser Val Ala Val Lys Met Asn
65              70              75              80

aat aat aat aat aac gat cta atg ggt aat aaa aaa ggg tca act ttc   288
Asn Asn Asn Asn Asn Asp Leu Met Gly Asn Lys Lys Gly Ser Thr Phe
            85              90              95

ata caa gaa cat cga gca ttg tta cca aaa gct ttg att ctg tgg atc   336
Ile Gln Glu His Arg Ala Leu Leu Pro Lys Ala Leu Ile Leu Trp Ile
            100             105             110

atc att gtt ggg ttt ata agc agt ggg att tat cag tgg atg gat gat   384
Ile Ile Val Gly Phe Ile Ser Ser Gly Ile Tyr Gln Trp Met Asp Asp
        115             120             125

gct aat aag att aga agg gaa gag gtt ttg gtc agc atg tgt gat caa   432
Ala Asn Lys Ile Arg Arg Glu Glu Val Leu Val Ser Met Cys Asp Gln
        130             135             140
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aga gct aga atg ttg cag gat caa ttt agt gtt agt gtt aat cat gtt    480
Arg Ala Arg Met Leu Gln Asp Gln Phe Ser Val Ser Val Asn His Val
145             150             155             160

cat gct ttg gct att ctc gtc tcc act ttt cat tac cac aag aac cct    528
His Ala Leu Ala Ile Leu Val Ser Thr Phe His Tyr His Lys Asn Pro
                165             170             175

tct gca att gat cag gag aca ttt gcg gag tac acg gca aga aca gca    576
Ser Ala Ile Asp Gln Glu Thr Phe Ala Glu Tyr Thr Ala Arg Thr Ala
            180             185             190

ttt gag aga ccg ttg cta agt gga gtg gct tat gct gaa aaa gtt gtg    624
Phe Glu Arg Pro Leu Leu Ser Gly Val Ala Tyr Ala Glu Lys Val Val
        195             200             205

aat ttt gag agg gag atg ttt gag cgg cag cac aat tgg gtt ata aag    672
Asn Phe Glu Arg Glu Met Phe Glu Arg Gln His Asn Trp Val Ile Lys
    210             215             220

aca atg gat aga gga gag cct tca ccg gtt agg gat gag tat gct cct    720
Thr Met Asp Arg Gly Glu Pro Ser Pro Val Arg Asp Glu Tyr Ala Pro
225             230             235             240

gtt ata ttc tct caa gat agt gtc tct tac ctt gag tca ctc gat atg    768
Val Ile Phe Ser Gln Asp Ser Val Ser Tyr Leu Glu Ser Leu Asp Met
            245             250             255

atg tca ggc gag gag gat cgt gag aat att ttg cga gct aga gaa acc    816
Met Ser Gly Glu Glu Asp Arg Glu Asn Ile Leu Arg Ala Arg Glu Thr
        260             265             270

gga aaa gct gtc ttg act agc cct ttt agg ttg ttg gaa act cac cat    864
Gly Lys Ala Val Leu Thr Ser Pro Phe Arg Leu Leu Glu Thr His His
        275             280             285

ctc gga gtt gtg ttg aca ttc cct gtc tac aag tct tct ctt cct gaa    912
Leu Gly Val Val Leu Thr Phe Pro Val Tyr Lys Ser Ser Leu Pro Glu
        290             295             300

aat ccg act gtc gaa gag cgt att gca gcc act gca ggg tac ctt ggt    960
Asn Pro Thr Val Glu Glu Arg Ile Ala Ala Thr Ala Gly Tyr Leu Gly
305             310             315             320

ggt gcg ttt gat gtg gag tct cta gtc gag aat tta ctt ggt cag ctt   1008
Gly Ala Phe Asp Val Glu Ser Leu Val Glu Asn Leu Leu Gly Gln Leu
            325             330             335

gct ggt aac caa gca ata gtt gtg cat gtg tat gat atc acc aat gca   1056
Ala Gly Asn Gln Ala Ile Val Val His Val Tyr Asp Ile Thr Asn Ala
            340             345             350

tca gat cca ctt gtc atg tat ggt aat caa gat gaa gaa gcc gac aga   1104
Ser Asp Pro Leu Val Met Tyr Gly Asn Gln Asp Glu Glu Ala Asp Arg
        355             360             365
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tct ctc tct cat gag agc aag ctc gat ttt gga gac ccc ttc agg aaa    1152
Ser Leu Ser His Glu Ser Lys Leu Asp Phe Gly Asp Pro Phe Arg Lys
    370             375             380

cat aag atg ata tgc agg tac cac caa aag gca cca ata cca ttg aat    1200
His Lys Met Ile Cys Arg Tyr His Gln Lys Ala Pro Ile Pro Leu Asn
385             390             395                         400

gtg ctc aca act gtg cca ttg ttc ttt gcg att ggt ttc ttg gtg ggt    1248
Val Leu Thr Thr Val Pro Leu Phe Phe Ala Ile Gly Phe Leu Val Gly
            405             410             415

tat ata ctg tat ggt gca gct atg cac ata gta aaa gtc gaa gat gat    1296
Tyr Ile Leu Tyr Gly Ala Ala Met His Ile Val Lys Val Glu Asp Asp
            420             425             430

ttc cat gaa atg caa gag ctt aaa gtg cga gca gaa gct gct gat gtc    1344
Phe His Glu Met Gln Glu Leu Lys Val Arg Ala Glu Ala Ala Asp Val
        435             440             445

gct aaa tcg cag ttt ctt gct acc gtg tct cac gag atc agg aca cca    1392
Ala Lys Ser Gln Phe Leu Ala Thr Val Ser His Glu Ile Arg Thr Pro
    450             455             460

atg aat ggc att ctc gga atg ctt gct atg ctc cta gat aca gaa cta    1440
Met Asn Gly Ile Leu Gly Met Leu Ala Met Leu Leu Asp Thr Glu Leu
465             470             475             480

agc tcg aca cag aga gat tac gct caa acc gct caa gta tgt ggt aaa    1488
Ser Ser Thr Gln Arg Asp Tyr Ala Gln Thr Ala Gln Val Cys Gly Lys
            485             490             495

gct ttg att gca ttg ata aat gag gtt ctt gat cgc gcc aag att gaa    1536
Ala Leu Ile Ala Leu Ile Asn Glu Val Leu Asp Arg Ala Lys Ile Glu
            500             505             510

gct gga aag ctg gag ttg gaa tca gta cca ttt gat atc cgt tca ata    1584
Ala Gly Lys Leu Glu Leu Glu Ser Val Pro Phe Asp Ile Arg Ser Ile
        515             520             525

ttg gat gat gtc ctt tct cta ttc tct gag gag tca agg aac aaa ggc    1632
Leu Asp Asp Val Leu Ser Leu Phe Ser Glu Glu Ser Arg Asn Lys Gly
        530             535             540

att gag ctc gcg gtt ttc gtt tca gac aaa gta cca gag ata gtc aaa    1680
Ile Glu Leu Ala Val Phe Val Ser Asp Lys Val Pro Glu Ile Val Lys
545             550             555             560

gga gat tca ggg aga ttt aga cag ata atc ata aac ctt gtt gga aat    1728
Gly Asp Ser Gly Arg Phe Arg Gln Ile Ile Ile Asn Leu Val Gly Asn
            565             570             575

tcg gtt aaa ttc aca gag aaa gga cat atc ttt gtt aaa gtc cat ctt    1776
Ser Val Lys Phe Thr Glu Lys Gly His Ile Phe Val Lys Val His Leu
            580             585             590
```

```
gcg gaa caa tca aaa gat gaa tct gaa ccg aaa aat gca ttg aat ggt    1824
Ala Glu Gln Ser Lys Asp Glu Ser Glu Pro Lys Asn Ala Leu Asn Gly
        595             600             605

gga gtg tct gaa gaa atg atc gtt gtt tcc aaa cag tca agt tac aac    1872
Gly Val Ser Glu Glu Met Ile Val Val Ser Lys Gln Ser Ser Tyr Asn
    610             615             620

aca ttg agc ggt tac gaa gct gct gat ggt cgg aat agc tgg gat tca    1920
Thr Leu Ser Gly Tyr Glu Ala Ala Asp Gly Arg Asn Ser Trp Asp Ser
625             630             635             640

ttc aag cat ttg gtc tct gag gag cag tca tta tcg gag ttt gat att    1968
Phe Lys His Leu Val Ser Glu Glu Gln Ser Leu Ser Glu Phe Asp Ile
            645             650             655

tct agc aat gtt agg ctt atg gtt tca atc gaa gac acg ggt att gga    2016
Ser Ser Asn Val Arg Leu Met Val Ser Ile Glu Asp Thr Gly Ile Gly
        660             665             670

atc cct tta gtt gca caa ggc cgt gtg ttt atg ccg ttt atg caa gca    2064
Ile Pro Leu Val Ala Gln Gly Arg Val Phe Met Pro Phe Met Gln Ala
        675             680             685

gat agc tcg act tca aga aac tat gga ggt act ggt att ggt ttg agt    2112
Asp Ser Ser Thr Ser Arg Asn Tyr Gly Gly Thr Gly Ile Gly Leu Ser
    690             695             700

ata agc aag tgt ctt gtt gaa ctt atg cgt ggt cag ata aat ttc ata    2160
Ile Ser Lys Cys Leu Val Glu Leu Met Arg Gly Gln Ile Asn Phe Ile
705             710             715             720

agc cgg cct cat att gga agc acg ttc tgg ttc acg gct gtt tta gag    2208
Ser Arg Pro His Ile Gly Ser Thr Phe Trp Phe Thr Ala Val Leu Glu
            725             730             735

aaa tgc gat aaa tgc agt gcg att aac cat atg aag aaa cct aat gtg    2256
Lys Cys Asp Lys Cys Ser Ala Ile Asn His Met Lys Lys Pro Asn Val
        740             745             750

gaa cac ttg cct tct act ttt aaa gga atg aaa gct ata gtt gtt gat    2304
Glu His Leu Pro Ser Thr Phe Lys Gly Met Lys Ala Ile Val Val Asp
        755             760             765

gct aag cct gtt aga gct gct gtg act aga tac cat atg aaa aga ctc    2352
Ala Lys Pro Val Arg Ala Ala Val Thr Arg Tyr His Met Lys Arg Leu
        770             775             780

gga atc aat gtt gat gtc gtg aca agt ctc aaa acc gct gtt gtt gca    2400
Gly Ile Asn Val Asp Val Val Thr Ser Leu Lys Thr Ala Val Val Ala
785             790             795             800

gct gct gcg ttt gaa aga aac ggt tct cct ctc cca aca aaa ccg caa    2448
Ala Ala Ala Phe Glu Arg Asn Gly Ser Pro Leu Pro Thr Lys Pro Gln
            805             810             815
```

```
ctt gat atg atc tta gta gag aaa gat tca tgg att tca act gaa gat    2496
Leu Asp Met Ile Leu Val Glu Lys Asp Ser Trp Ile Ser Thr Glu Asp
            820             825             830

aat gac tca gag att cgt tta ttg aat tca aga acc aac gga aac gtt    2544
Asn Asp Ser Glu Ile Arg Leu Leu Asn Ser Arg Thr Asn Gly Asn Val
            835             840             845

cat cac aag tct ccg aaa cta gct cta ttc gca aca aac atc aca aat    2592
His His Lys Ser Pro Lys Leu Ala Leu Phe Ala Thr Asn Ile Thr Asn
            850             855             860

tcg gag ttc gac aga gct aaa tcc gca gga ttt gca gat acg gta ata    2640
Ser Glu Phe Asp Arg Ala Lys Ser Ala Gly Phe Ala Asp Thr Val Ile
865             870             875             880

atg aaa ccg tta aga gca agc atg att ggg gcg tgt ctg caa caa gtt    2688
Met Lys Pro Leu Arg Ala Ser Met Ile Gly Ala Cys Leu Gln Gln Val
            885             890             895

ctc gag ctg aga aaa aca aga caa caa cat cca gaa gga tca tca ccc    2736
Leu Glu Leu Arg Lys Thr Arg Gln Gln His Pro Glu Gly Ser Ser Pro
            900             905             910

gca act ctc aag agc ttg ctt aca ggg aag aag att ctt gtg gtt gat    2784
Ala Thr Leu Lys Ser Leu Leu Thr Gly Lys Lys Ile Leu Val Val Asp
            915             920             925

gat aat ata gtt aac agg aga gta gct gca gga gct ctc aag aaa ttt    2832
Asp Asn Ile Val Asn Arg Arg Val Ala Ala Gly Ala Leu Lys Lys Phe
            930             935             940

gga gca gaa gtg gtt tgt gca gag agt ggt caa gtt gct ttg ggt ttg    2880
Gly Ala Glu Val Val Cys Ala Glu Ser Gly Gln Val Ala Leu Gly Leu
945             950             955             960

ctt cag att cca cac act ttc gat gct tgc ttc atg gat att caa atg    2928
Leu Gln Ile Pro His Thr Phe Asp Ala Cys Phe Met Asp Ile Gln Met
            965             970             975

cca cag atg gac gga ttt gaa gca act cgt cag ata aga atg atg gag    2976
Pro Gln Met Asp Gly Phe Glu Ala Thr Arg Gln Ile Arg Met Met Glu
            980             985             990

aag gaa gct aaa gag aag acg aat ctc gaa tgg cat tta ccg att cta    3024
Lys Glu Ala Lys Glu Lys Thr Asn Leu Glu Trp His Leu Pro Ile Leu
            995             1000            1005

gcg atg act gcg gat gtg ata cac gcg acc tac gag gaa tgt ctg aaa    3072
Ala Met Thr Ala Asp Val Ile His Ala Thr Tyr Glu Glu Cys Leu Lys
    1010            1015            1020

agt ggg atg gat ggt tac gtc tcc aaa cct ttt gaa gaa gag aat ctc    3120
Ser Gly Met Asp Gly Tyr Val Ser Lys Pro Phe Glu Glu Glu Asn Leu
1025            1030            1035            1040
```

```
tat aaa tcc gtt gcc aaa tca ttc aaa cct aat cct atc tca cct tcg    3168
Tyr Lys Ser Val Ala Lys Ser Phe Lys Pro Asn Pro Ile Ser Pro Ser
                1045                    1050                1055

tcg taa                                                            3174
Ser
```

<210> 6
<211> 1057
<212> PRT
<213> Arabidopsis thaliana

<400> 6

```
Met Asn Trp Ala Leu Asn Asn His Gln Glu Glu Glu Glu Glu Pro Arg
 1               5               10                  15

Arg Ile Glu Ile Ser Asp Ser Glu Ser Leu Glu Asn Leu Lys Ser Ser
            20              25              30

Asp Phe Tyr Gln Leu Gly Gly Gly Gly Ala Leu Asn Ser Ser Glu Lys
        35                40                  45

Pro Arg Lys Ile Asp Phe Trp Arg Ser Gly Leu Met Gly Phe Ala Lys
    50              55              60

Met Gln Gln Gln Gln Gln Leu Gln His Ser Val Ala Val Lys Met Asn
65                  70                  75                  80

Asn Asn Asn Asn Asn Asp Leu Met Gly Asn Lys Lys Gly Ser Thr Phe
                85                  90                  95

Ile Gln Glu His Arg Ala Leu Leu Pro Lys Ala Leu Ile Leu Trp Ile
            100             105             110

Ile Ile Val Gly Phe Ile Ser Ser Gly Ile Tyr Gln Trp Met Asp Asp
        115             120             125

Ala Asn Lys Ile Arg Arg Glu Glu Val Leu Val Ser Met Cys Asp Gln
    130             135             140

Arg Ala Arg Met Leu Gln Asp Gln Phe Ser Val Ser Val Asn His Val
145             150             155             160

His Ala Leu Ala Ile Leu Val Ser Thr Phe His Tyr His Lys Asn Pro
            165             170             175

Ser Ala Ile Asp Gln Glu Thr Phe Ala Glu Tyr Thr Ala Arg Thr Ala
        180             185             190

Phe Glu Arg Pro Leu Leu Ser Gly Val Ala Tyr Ala Glu Lys Val Val
        195             200             205

Asn Phe Glu Arg Glu Met Phe Glu Arg Gln His Asn Trp Val Ile Lys
    210             215             220

Thr Met Asp Arg Gly Glu Pro Ser Pro Val Arg Asp Glu Tyr Ala Pro
225             230             235             240
```

Val Ile Phe Ser Gln Asp Ser Val Ser Tyr Leu Glu Ser Leu Asp Met
                245   250   255

Met Ser Gly Glu Glu Asp Arg Glu Asn Ile Leu Arg Ala Arg Glu Thr
            260   265   270

Gly Lys Ala Val Leu Thr Ser Pro Phe Arg Leu Leu Glu Thr His His
        275   280   285

Leu Gly Val Val Leu Thr Phe Pro Val Tyr Lys Ser Ser Leu Pro Glu
    290   295   300

Asn Pro Thr Val Glu Glu Arg Ile Ala Ala Thr Ala Gly Tyr Leu Gly
305   310   315   320

Gly Ala Phe Asp Val Glu Ser Leu Val Glu Asn Leu Leu Gly Gln Leu
            325   330   335

Ala Gly Asn Gln Ala Ile Val Val His Val Tyr Asp Ile Thr Asn Ala
        340   345   350

Ser Asp Pro Leu Val Met Tyr Gly Asn Gln Asp Glu Glu Ala Asp Arg
        355   360   365

Ser Leu Ser His Glu Ser Lys Leu Asp Phe Gly Asp Pro Phe Arg Lys
    370   375   380

His Lys Met Ile Cys Arg Tyr His Gln Lys Ala Pro Ile Pro Leu Asn
385   390   395   400

Val Leu Thr Thr Val Pro Leu Phe Phe Ala Ile Gly Phe Leu Val Gly
            405   410   415

Tyr Ile Leu Tyr Gly Ala Ala Met His Ile Val Lys Val Glu Asp Asp
            420   425   430

Phe His Glu Met Gln Glu Leu Lys Val Arg Ala Glu Ala Ala Asp Val
        435   440   445

Ala Lys Ser Gln Phe Leu Ala Thr Val Ser His Glu Ile Arg Thr Pro
    450   455   460

Met Asn Gly Ile Leu Gly Met Leu Ala Met Leu Leu Asp Thr Glu Leu
465   470   475   480

Ser Ser Thr Gln Arg Asp Tyr Ala Gln Thr Ala Gln Val Cys Gly Lys
            485   490   495

Ala Leu Ile Ala Leu Ile Asn Glu Val Leu Asp Arg Ala Lys Ile Glu
        500   505   510

Ala Gly Lys Leu Glu Leu Glu Ser Val Pro Phe Asp Ile Arg Ser Ile
        515   520   525

Leu Asp Asp Val Leu Ser Leu Phe Ser Glu Glu Ser Arg Asn Lys Gly
    530   535   540

```
Ile Glu Leu Ala Val Phe Val Ser Asp Lys Val Pro Glu Ile Val Lys
545             550             555             560

Gly Asp Ser Gly Arg Phe Arg Gln Ile Ile Ile Asn Leu Val Gly Asn
            565             570             575

Ser Val Lys Phe Thr Glu Lys Gly His Ile Phe Val Lys Val His Leu
        580             585             590

Ala Glu Gln Ser Lys Asp Glu Ser Glu Pro Lys Asn Ala Leu Asn Gly
        595             600             605

Gly Val Ser Glu Glu Met Ile Val Val Ser Lys Gln Ser Ser Tyr Asn
    610             615             620

Thr Leu Ser Gly Tyr Glu Ala Ala Asp Gly Arg Asn Ser Trp Asp Ser
625             630             635             640

Phe Lys His Leu Val Ser Glu Glu Gln Ser Leu Ser Glu Phe Asp Ile
            645             650             655

Ser Ser Asn Val Arg Leu Met Val Ser Ile Glu Asp Thr Gly Ile Gly
            660             665             670

Ile Pro Leu Val Ala Gln Gly Arg Val Phe Met Pro Phe Met Gln Ala
        675             680             685

Asp Ser Ser Thr Ser Arg Asn Tyr Gly Gly Thr Gly Ile Gly Leu Ser
    690             695             700

Ile Ser Lys Cys Leu Val Glu Leu Met Arg Gly Gln Ile Asn Phe Ile
705             710             715             720

Ser Arg Pro His Ile Gly Ser Thr Phe Trp Phe Thr Ala Val Leu Glu
            725             730             735

Lys Cys Asp Lys Cys Ser Ala Ile Asn His Met Lys Lys Pro Asn Val
            740             745             750

Glu His Leu Pro Ser Thr Phe Lys Gly Met Lys Ala Ile Val Val Asp
        755             760             765

Ala Lys Pro Val Arg Ala Ala Val Thr Arg Tyr His Met Lys Arg Leu
    770             775             780

Gly Ile Asn Val Asp Val Val Thr Ser Leu Lys Thr Ala Val Val Ala
785             790             795             800

Ala Ala Ala Phe Glu Arg Asn Gly Ser Pro Leu Pro Thr Lys Pro Gln
            805             810             815

Leu Asp Met Ile Leu Val Glu Lys Asp Ser Trp Ile Ser Thr Glu Asp
            820             825             830

Asn Asp Ser Glu Ile Arg Leu Leu Asn Ser Arg Thr Asn Gly Asn Val
        835             840             845
```

His His Lys Ser Pro Lys Leu Ala Leu Phe Ala Thr Asn Ile Thr Asn
    850   855   860

Ser Glu Phe Asp Arg Ala Lys Ser Ala Gly Phe Ala Asp Thr Val Ile
865   870   875   880

Met Lys Pro Leu Arg Ala Ser Met Ile Gly Ala Cys Leu Gln Gln Val
          885   890   895

Leu Glu Leu Arg Lys Thr Arg Gln Gln His Pro Glu Gly Ser Ser Pro
          900   905   910

Ala Thr Leu Lys Ser Leu Leu Thr Gly Lys Lys Ile Leu Val Val Asp
          915   920   925

Asp Asn Ile Val Asn Arg Arg Val Ala Ala Gly Ala Leu Lys Lys Phe
          930   935   940

Gly Ala Glu Val Val Cys Ala Glu Ser Gly Gln Val Ala Leu Gly Leu
945   950   955   960

Leu Gln Ile Pro His Thr Phe Asp Ala Cys Phe Met Asp Ile Gln Met
          965   970   975

Pro Gln Met Asp Gly Phe Glu Ala Thr Arg Gln Ile Arg Met Met Glu
          980   985   990

Lys Glu Ala Lys Glu Lys Thr Asn Leu Glu Trp His Leu Pro Ile Leu
          995   1000   1005

Ala Met Thr Ala Asp Val Ile His Ala Thr Tyr Glu Glu Cys Leu Lys
    1010   1015   1020

Ser Gly Met Asp Gly Tyr Val Ser Lys Pro Phe Glu Glu Glu Asn Leu
1025   1030   1035   1040

Tyr Lys Ser Val Ala Lys Ser Phe Lys Pro Asn Pro Ile Ser Pro Ser
            1045   1050   1055

Ser

<210> 7
<211> 125
<212> PRT
<213> Saccharomyces cerevisiae

<400> 7
Glu Thr Ser Val Lys Ile Leu Val Val Glu Asp Asn His Val Asn Gln
  1   5   10   15

Glu Val Ile Lys Arg Met Leu Asn Leu Glu Gly Ile Glu Asn Ile Glu
          20   25   30

Leu Ala Cys Asp Gly Gln Glu Ala Phe Asp Lys Val Lys Glu Leu Thr
          35   40   45

Ser Lys Gly Glu Asn Tyr Asn Met Ile Phe Met Asp Val Gln Met Pro
    50   55   60

Lys Val Asp Gly Leu Leu Ser Thr Lys Met Ile Arg Arg Asp Leu Gly
 65   70   75   80

Tyr Thr Ser Pro Ile Val Ala Leu Thr Ala Phe Ala Asp Asp Ser Asn
          85   90   95

Ile Lys Glu Cys Leu Glu Ser Gly Met Asn Gly Phe Leu Ser Lys Pro
        100   105   110

Ile Lys Arg Pro Lys Leu Lys Thr Ile Leu Thr Glu Phe
       115   120   125

<210> 8
<211> 118
<212> PRT
<213> Escherichia coli

<400> 8
Asn Asp Asp Met Met Ile Leu Val Val Asp Asp His Pro Ile Asn Arg
  1   5   10   15

Arg Leu Leu Ala Asp Gln Leu Gly Ser Leu Gly Tyr Gln Cys Lys Thr
        20   25   30

Ala Asn Asp Gly Val Asp Ala Leu Asn Val Leu Ser Lys Asn His Ile
        35   40   45

Asp Ile Val Leu Ser Asp Val Asn Met Pro Asn Met Asp Gly Tyr Arg
     50   55   60

Leu Thr Gln Arg Ile Arg Gln Leu Gly Leu Thr Leu Pro Val Ile Gly
 65   70   75   80

Val Thr Ala Asn Ala Leu Ala Glu Glu Lys Gln Arg Cys Leu Glu Ser
        85   90   95

Gly Met Asp Ser Cys Leu Ser Lys Pro Val Thr Leu Asp Val Ile Lys
        100   105   110

Gln Ser Leu Thr Leu Tyr
        115

<210> 9
<211> 32
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
     oligonucleotide primer for PCR

<400> 9
tccccgcgga aaatgttctt acggttaggt ag   32

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<210> 10
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
      oligonucleotide primer for PCR

<400> 10
tcggtcgact tatgattctg tatctgaagg cga                               33


<210> 11
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
      oligonucleotide primer for PCR

<400> 11
tcagatatga actgggcact caac                                        24


<210> 12
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
      oligonucleotide primer for PCR

<400> 12
ctcaatgctt ttgttccttg actc                                        24


<210> 13
<211> 31
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
      oligonucleotide primer for PCR

<400> 13
accatgaact gggcactcaa caatcatcaa g                                31


<210> 14
<211> 30
<212> DNA
<213> Artificial Sequence
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<220>
<223> Description of Artificial Sequence: Synthetic
        oligonucleotide primer for PCR

<400> 14
ggattacgac gaaggtgaga taggattagg   30

<210> 15
<211> 32
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
        oligonucleotide primer for PCR

<400> 15
gatcccagct agctagggcc ctaccgcggg ga   32

<210> 16
<211> 32
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
        oligonucleotide primer for PCR

<400> 16
tccccgcgga aaatgttctt acggttaggt ag   32

<210> 17
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
        oligonucleotide primer for PCR

<400> 17
tcggtcgact tatgattctg tatctgaagg cga   33

<210> 18
<211> 32
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
        oligonucleotide primer for PCR

<400> 18
ctagtccccg cggtagggcc ctagctagct gg   32

<210> 19
<211> 31
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
      oligonucleotide primer for PCR

<400> 19
tccccgcgga aaatgtctat aacttgtgag c   31

<210> 20
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
      oligonucleotide primer for PCR

<400> 20
ctagctagct taacaaggtt caaagaatct tgc   33

<210> 21
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
      oligonucleotide primer for PCR

<400> 21
tccccgcgga aaatgaaagc acgaggtgag agg   33

<210> 22
<211> 32
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
      oligonucleotide primer for PCR

<400> 22
ctagctagct taacaaggtt caaagaattt gc   32